




# Power MOSFETS


## DATASHEET


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**LM30C18PGI3A**

P-Channel  
Enhancement Mode MOSFET

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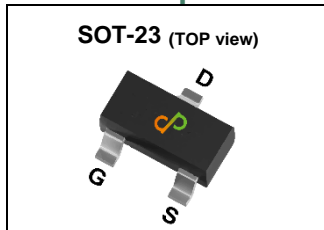


Quality Management Systems

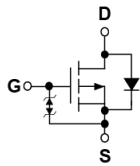
ISO 9001:2015 Certificate

## P-Channel Enhancement Mode MOSFET

### Pin Description



### Symbol



### Product Summary

Symbol	P-Channel	Unit
$V_{DSS}$	-30	V
$R_{DS(ON)-Max}$	420	m $\Omega$
ID	-1.2	A

### Feature

- Reliable and Rugged
- ROHS Compliant

### Applications

- Load Switches
- BLDC Motor

### Ordering Information

Orderable Part Number	Package Type	Form	Shipping	Marking
LM30C18PGI3A	SOT-23	Tape & Reel	3000 / Tape & Reel	30C18 □□□□□□

Note : □□□□□□ = Lot Code

### Absolute Maximum Ratings (T<sub>J</sub>=25°C Unless Otherwise Noted)

Symbol	Parameter	P-Channel	Unit
$V_{DSS}$	Drain-Source Voltage	-30	V
$V_{GSS}$	Gate-Source Voltage	±8	
$T_J$	Maximum Junction Temperature	150	°C
$T_{STG}$	Storage Temperature Range	-55 to 150	°C
$I_S$	Diode Continuous Forward Current	-0.31	A
$I_{DM}$	Pulse Drain Current Tested	$T_A=25^\circ\text{C}$ -2.9	A
$I_D$	Continuous Drain Current	$T_A=25^\circ\text{C}$ -1.2 <sup>①</sup>	A
		$T_A=70^\circ\text{C}$ -0.9	
$P_D$	Maximum Power Dissipation	$T_A=25^\circ\text{C}$ 0.9	W
		$T_A=70^\circ\text{C}$ 0.6	
$I_{AS}$ <sup>②</sup>	Avalanche Current, Single pulse	L=0.1mH -4	A
		L=0.5mH -2.5	
$E_{AS}$ <sup>②</sup>	Avalanche Energy, Single pulse	L=0.1mH 0.8	mJ
		L=0.5mH 1.6	

### Thermal Characteristics

Symbol	Parameter	Rating	Unit
$R_{\theta JA}$ <sup>③</sup>	Thermal Resistance-Junction to Ambient	Steady State 140	°C/W

Note ① : Max. current is limited by junction temperature

Note ② : UIS tested and pulse width are limited by maximum junction temperature 150°C

Note ③ : Surface Mounted on 1in<sup>2</sup> FR-4 board with 1oz.

## P-Channel Electrical Characteristics (T<sub>J</sub>=25°C Unless Otherwise Noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
<b>Static Electrical Characteristics</b>						
<b>BV<sub>DSS</sub></b>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>DS</sub> =-250uA	-30	-	-	V
<b>I<sub>DSS</sub></b>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =-24V, V <sub>GS</sub> =0V	-	-	-1	uA
<b>V<sub>GS(th)</sub></b>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>DS</sub> =-250uA	-0.4	-0.7	-1.3	V
<b>I<sub>GSS</sub></b>	Gate Leakage Current	V <sub>GS</sub> =±8V, V <sub>DS</sub> =0V	-	-	±10	uA
<b>R<sub>DS(ON)</sub></b> <sup>④</sup>	Drain-Source On-state Resistance	V <sub>GS</sub> =-4.5V, I <sub>DS</sub> =-2A	-	320	420	mΩ
		V <sub>GS</sub> =-2.5V, I <sub>DS</sub> =-0.3A	-	350	490	
		V <sub>GS</sub> =-1.8V, I <sub>DS</sub> =-0.15A	-	385	600	
<b>gfs</b>	Forward Transconductance	V <sub>DS</sub> =-5V, I <sub>DS</sub> =-0.2A	-	1.43	-	S
<b>Dynamic Characteristics</b> <sup>⑤</sup>						
<b>R<sub>G</sub></b>	Gate Resistance	V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, Freq.=1MHz	-	56	-	Ω
<b>C<sub>iss</sub></b>	Input Capacitance	V <sub>GS</sub> =0V, V <sub>DS</sub> =-15V, Freq.=1MHz	-	185	-	pF
<b>C<sub>OSS</sub></b>	Output Capacitance		-	21	-	
<b>C<sub>rss</sub></b>	Reverse Transfer Capacitance		-	16	-	
<b>t<sub>d(ON)</sub></b>	Turn-on Delay Time	V <sub>GS</sub> =-4.5V, V <sub>DS</sub> =-15V, I <sub>D</sub> =-1A, R <sub>GEN</sub> =1Ω	-	4	-	nS
<b>t<sub>r</sub></b>	Turn-on Rise Time		-	13	-	
<b>t<sub>d(OFF)</sub></b>	Turn-off Delay Time		-	22	-	
<b>t<sub>f</sub></b>	Turn-off Fall Time		-	95	-	
<b>Q<sub>g</sub></b>	Total Gate Charge	V <sub>GS</sub> =-2.5V, V <sub>DS</sub> =-15V, I <sub>D</sub> =-2A	-	1	-	nS
<b>Q<sub>g</sub></b>	Total Gate Charge	V <sub>GS</sub> =-4.5V, V <sub>DS</sub> =-15V, I <sub>D</sub> =-2A	-	1.9	-	
<b>Q<sub>gs</sub></b>	Gate-Source Charge		-	0.4	-	
<b>Q<sub>gd</sub></b>	Gate-Drain Charge		-	0.3	-	
<b>Source-Drain Characteristics</b>						
<b>V<sub>SD</sub></b> <sup>④</sup>	Diode Forward Voltage	I <sub>SD</sub> =-0.2A, V <sub>GS</sub> =0V	-	-0.7	-1.1	V
<b>t<sub>rr</sub></b>	Reverse Recovery Time	I <sub>F</sub> =-1A, V <sub>R</sub> =-24V	-	10	-	nS
<b>Q<sub>rr</sub></b>	Reverse Recovery Charge	diF/dt=100A/μs	-	2.2	-	nC

Note ④ : Pulse test (pulse width≤300us, duty cycle≤2%).

Note ⑤ : Guaranteed by design, not subject to production testing.

## P-Channel Typical Characteristics

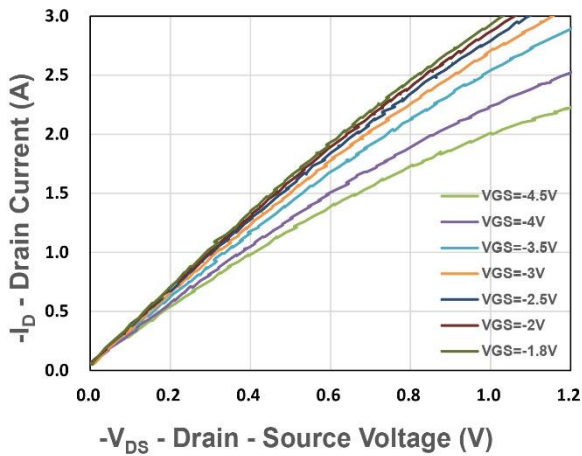


Figure 1. Output Characteristics

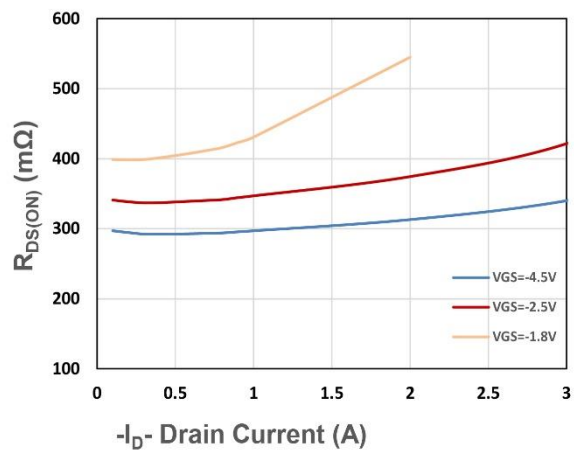


Figure 2. On-Resistance vs. ID

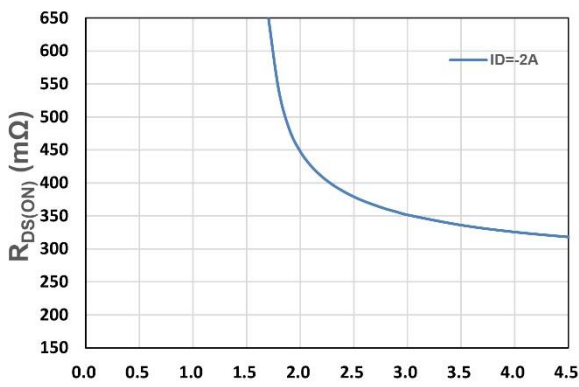


Figure 3. On-Resistance vs. VGS

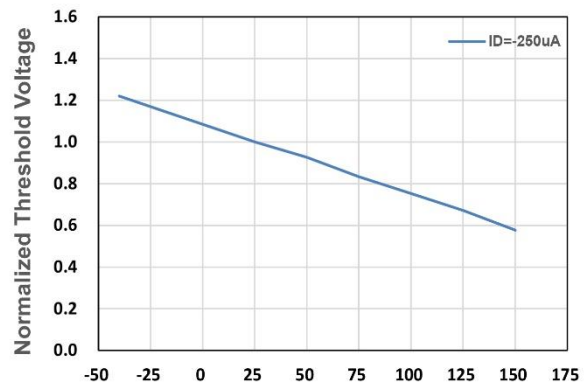


Figure 4. Gate Threshold Voltage

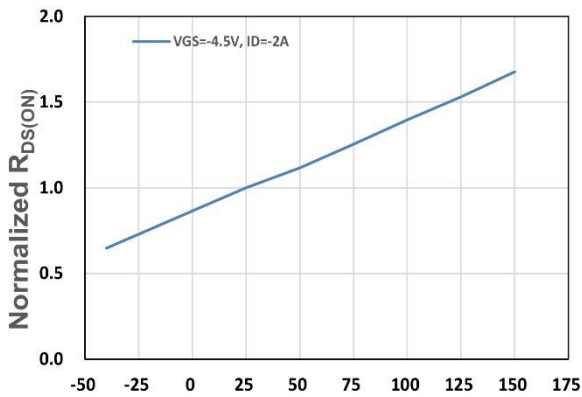


Figure 5. Drain-Source On Resistance

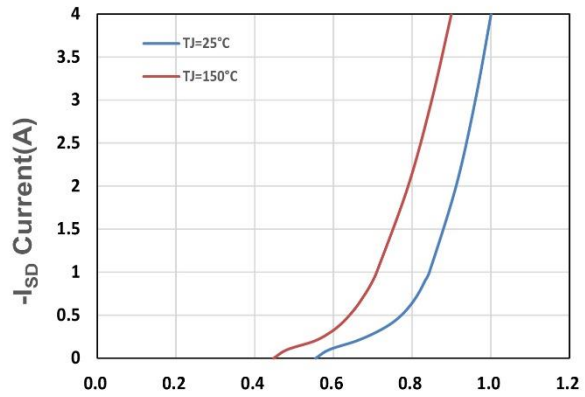
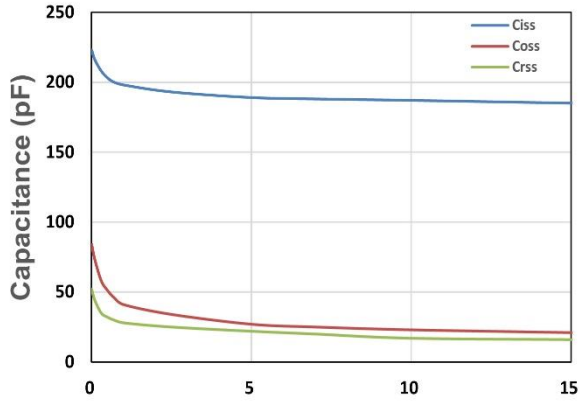
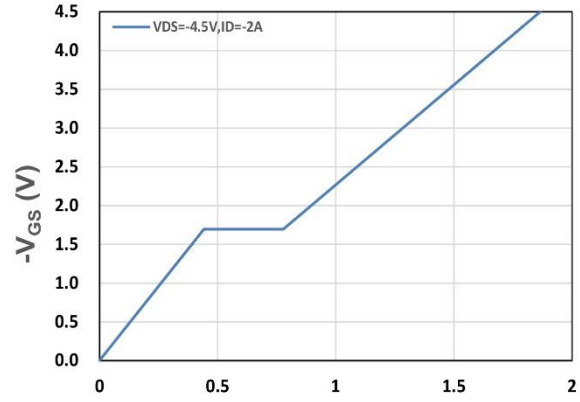


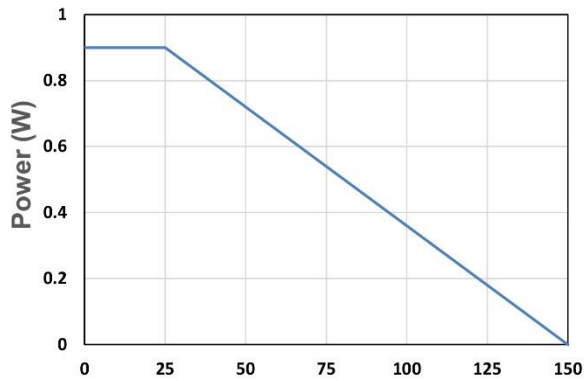
Figure 6. Source-Drain Diode Forward



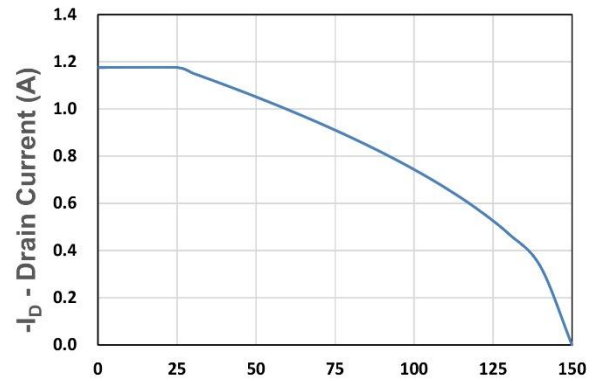
$-V_{DS}$  - Drain - Source Voltage (V)  
Figure 7. Capacitance



$Q_g$ , Total Gate Charge (nC)  
Figure 8. Gate Charge Characteristics



$T_A$  - Ambient Temperature (°C)  
Figure 9. Power Dissipation



$T_A$  - Ambient Temperature (°C)  
Figure 10. Drain Current

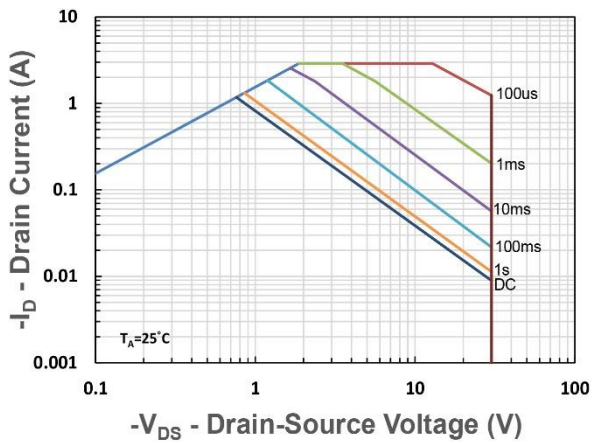


Figure 11. Safe Operating Area

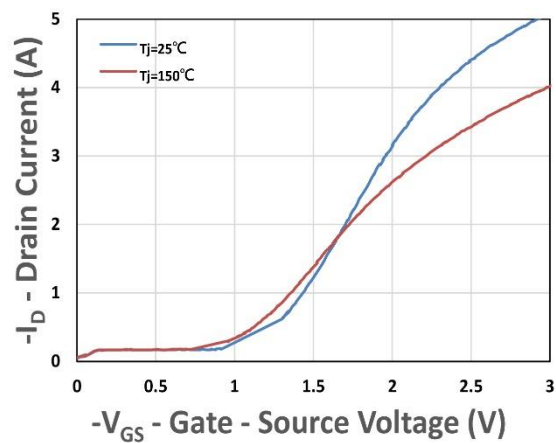


Figure 12. Transfer Characteristics

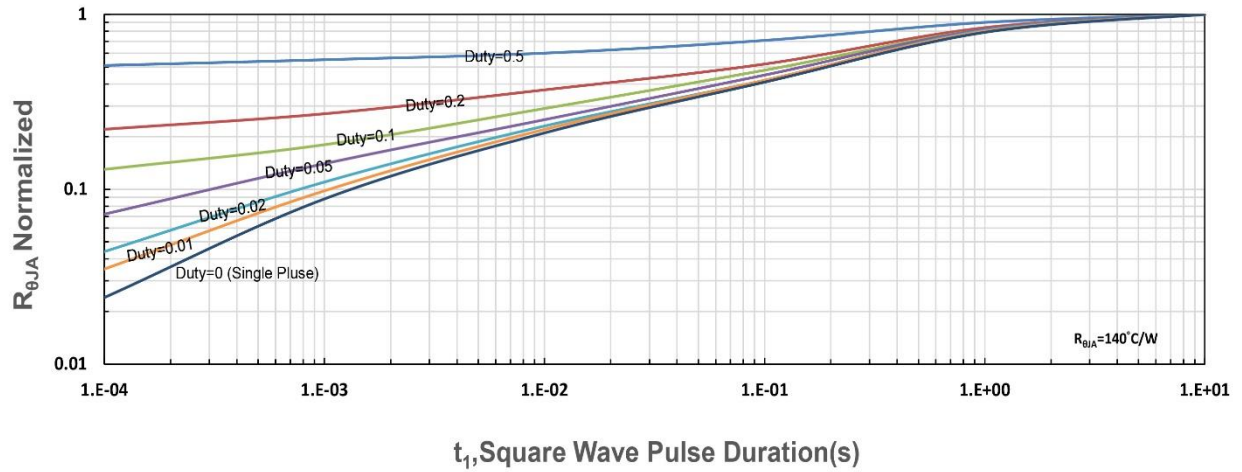


Figure 13.  $R_{\theta JA}$  Transient Thermal Impedance